REMARKS

Claims 1-8 and 12-13 are presently pending in the application.

Claim 8 has been amended to make clear that at least one layer of adhesive polymeric foam is placed on at least one face of the panel, i.e., on an outside surface of the panel. This amendment is supported, for example, in paragraph [0022] at page 5, lines 5 and 6 of the Substitute Specification. Accordingly, no new matter has been added and entry of the Amendment is respectfully requested. This Amendment is being made in view of the Examiner's comment at the middle of page 7 of the Office Action that he is interpreting claim 8 broadly to refer to an inside surface of the panel. While an envelope comprising a barrier sheet might be interpreted to have an inside surface, it is submitted that the Examiner's interpretation of the panel as having an inside surface is improper, because the panel is filled and therefore essentially has no inside surface. In any event, the present Amendment makes this clear, since the faces of the panel can only be the outside surfaces.

The Examiner has rejected claims 1-4, 7, 12 and 13 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,107,649 of Benson et al. ("Benson") in view of U.S. Patent 5,792,539 of Hunter, U.S. Patent 6,189,354 of Späth, and Applicant's own admission at page 1, paragraph [0005] of the specification. Further, at paragraph 3, page 5 of the Office Action, the Examiner rejects claims 5 and 6 as being unpatentable over the above combination of references, further in view of U.S. Patent 6,336,693 of Nishimoto. Finally, at paragraph 12 (sic 4) at page 6 of the Office Action, the Examiner rejects claim 8 as being unpatentable over the above combination of references further in view of U.S. Patent 4,011,357 of Haase. These rejections are respectfully but strenuously traversed for the reasons set forth in detail below.

At the outset, Applicants strenuously object to the Examiner's "mosaic" rejections based upon 4 or 5 references and further picking and choosing among different embodiments of the references, including particularly the references of Benson and Hunter. Such rejections are *prima facie* improper as being based upon hindsight using Applicants' own teachings and claims to select from the myriad teachings of the prior art. Moreover, Applicants object to the Examiner's numerous misstatements and distortions of the prior art references, as discussed below. Finally, although the Examiner has withdrawn the previous rejections based on Yamashita (paragraph 4 at page 7 of the Office Action), it is noted that the Examiner is still

referring to Yamashita et al. in the present rejection at the bottom of page 3 of the Office Action. Nevertheless, Applicants respond to the present rejections as follows.

With regard to claim 1, the Examiner first argues that Benson discloses a known procedure for producing a planar thermo-insulating vacuum panel (column 4, lines 40-52), having an envelope (Fig. 15, number 82), comprising at least one multi-layer sheet (column 8, lines 50-54), and containing at least one filler selected from the group consisting of inorganic powders and porous organic foams (column 16, lines 25-29), and that the panel can be curved into a cylinder (column 9, lines 22-26 and Fig. 18). This paragraph at page 2 of the Office Action is a perfect example of how the Examiner has distorted both the presently claimed invention and the Benson reference, as well as picking and choosing from different embodiments of Benson.

First, while Benson does teach embodiments for producing a planar thermo-insulating vacuum panel (see, for example, panel 10 in Fig. 2), all of the embodiments shown and described in Benson have envelopes comprising only a single layer sheet on each side (for example, sheets 12, 14 in Fig. 2) surrounding the spherical spacers (e.g., spherical glass beads 16 in Fig. 2). Applicants can find no teaching in Benson of a multilayer sheet for the envelope.

Contrary to the Examiner's contention, reference numeral 82 in Fig. 15 is not an envelope, but rather a conventional insulation filler material which fills the spaces between panels 10, both laterally between the ends of adjacent panels 10 and in the stacked or vertical direction between adjacent rows of panels 10 (see column 8, lines 50-64). This filler can be an inorganic powder or a porous organic foam. However, the filler is not contained in any envelope (it is outside the envelopes of the panels 10), and there is no outer evacuated envelope enclosing these fillers in the embodiment of Fig. 15 or any other embodiment of Benson. Fig. 15 is merely a composite panel 80 with a plurality of panels 10 stacked or laminated together by the conventional insulation material 82, which may be a flexible foam or powder insulation material (column 8, lines 53-58). Hence, Benson clearly does not show the basic planar thermo-insulating vacuum panel as presently claimed.

The Examiner next acknowledges that Benson does not expressly disclose that the powders and foams are included inside the vacuum envelope, but argues that Hunter teaches a bendable vacuum panel (column 8, lines 57-67) which contains at least one filler selected from the group consisting of inorganic powders and porous organic foams (column 9, lines 21-29).

The Examiner concludes that it would have been obvious to one skilled in the art to include a powder and foam as taught by Hunter, because Hunter provides the motivation to do so at column 9, lines 46-49, namely increasing the R value significantly (see paragraph bridging pages 2 and 3 of the Office Action).

This paragraph of the rejection is a gross distortion of the teachings of Hunter. By relying on portions of Hunter at column 8 and column 9, the Examiner is mixing up the two distinct embodiments of Hunter and improperly picking and choosing elements from distinct and inconsistent embodiments. Thus, the portion relied upon by the Examiner at the bottom of column 8 relates to the example of Fig. 8, which is representative of the first embodiment of Hunter, while the portion relied upon by the Examiner in column 9 relates to the example of Fig. 10, which is representative of the second embodiment of Hunter. These embodiments are distinguished by Hunter, for example at column 4, lines 42-62, where Hunter describes the difference between three-dimensional thermal insulation elements which are suitable for "stacking" (first embodiment) and three-dimensional thermal insulation elements which are appropriate for "nesting" (second embodiment).

An important consequence of these different embodiments is that the stacked embodiment of Figs. 8 and 9, for example, may be curved (see column 8, line 67 and column 9, line 4). However, Applicants can find no indication whatsoever that the second embodiment of Hunter, where the thermal insulation members are nested, may be curved. That is, for the second embodiment, where the fillers may be selected from inorganic powders and porous organic foams, Hunter does not show or disclose any curved formations. To the contrary, this appears to be why Hunter states at column 8, lines 62-64 that "another consideration in the choice of a three-dimensional design is whether the barrier can be bent." That is, Hunter is indicating here that if one wants to be able to bend the thermal insulation panel, one should select the stacked three-dimensional design of the first embodiment, rather than the nested three-dimensional design of the second embodiment.

Further, the Examiner's alleged motivation for modifying Benson to include a powder or foam as taught by Hunter makes no sense. The alleged motivation is the significant increase in R value (column 9, lines 46-49 of Hunter). However, what Hunter is suggesting at this place in the specification is that the R value may be increased by alternating tensile and compressive elements 14 and 12, respectively, by making a multi-layered barrier 10 as shown in Fig. 11.

There is no indication here that the R value would be increased by including a powder or foam, as alleged by the Examiner. In fact, just the opposite is true, since Hunter specifically states that three-dimensional designs which cause stacking of adjacent thermal insulation elements is the preferred form of thermal insulation barrier (see column 4, lines 58-62). Therefore, Hunter actually teaches away from using the powder or foam solid thermal insulation elements 18 and 19 of Fig. 10. The motivation alleged by the Examiner is therefore lacking.

The Examiner then acknowledges (first full paragraph at page 3 of the Office Action) that Benson does not disclose the method by which the panel is curved, but does disclose panels comprising metal sheets and that the sheets may be bent. The Examiner argues that Späth discloses a method for curving hollow metal sheets by calendaring using two rollers and a third element. The Examiner concludes that it would have been obvious to one skilled in the art to curve the panels of Benson using the method of Späth. The Examiner alleges that the motivation to do so would have been to produce a curved hollow metal sheet, so that the hollow section is protected against bulges, nicks or against any other kind of deformation (referring to column 1, lines 56-63 of Späth).

Again, the Examiner's alleged motivation is misplaced. The protection against bulges, nicks or against any other kind of deformation, referred to by Späth, is not due to calendaring by using two rollers and a third element, as presently claimed. Instead, as explained by Späth at column 1, lines 56-63, the protection against bulges, nicks or other deformation is due to the provision of a ball mandrel or a mandrel shank, which is kept stationary within the range of bending, so that the hollow section to be bent is optimally supported within the range (see mandrel rod 7 and mandrel balls 9, for example in Figs. 1, 3, 4 and 6-12 of Späth). However, such an arrangement using a mandrel rod and mandrel balls is only possible with a truly hollow section, such as shown by reference numeral 4 in Späth. It is not possible with filled panels as used in the present invention or panels with spherical spacers 16 as shown in Benson, since the filler materials or spacers would interfere with the mandrel rod and mandrel balls, or *vice versa*. Therefore, contrary to the Examiner's contention, the method of Späth is not suitable to curve the panels of Benson and would teach one skilled in the art nothing with respect to the presently claimed invention.

Further, at the bottom of page 3 of the Office Action, the Examiner acknowledges that Benson does not expressly disclose that the vacuum panel comprises at least one metal sheet

having a thickness not greater than 100μm. The Examiner notes Applicants' admission that envelopes made of barrier sheets of thickness not great than 100μm are known in the art (paragraph [005] at page 1 of the specification). The Examiner concludes that it would have been obvious to one skilled in the art to assemble and curve a vacuum panel as taught by Benson in view of Yamashita et al. (sic) having a barrier sheet of less than 100μm thickness. The Examiner argues that the motivation to do so would have been to create a high-performance insulation material occupying less volume that is therefore more valuable (Benson, column 12, lines 12-14).

Again, the Examiner has totally confused and distorted the references. The reference to Yamashita et al. is not understood, since Yamashita is not listed as being part of the rejection, and the Examiner has indicated that the prior rejections based upon Yamashita have been withdrawn. It is assumed that the Examiner meant to refer to assembling and curving a vacuum panel as taught by Benson in view of Späth. However, the metal sheets of Benson and Späth are both quite different from the thin metal sheets of the panels of the presently claimed invention. Thus, the metal walls or sheets of Benson and Späth are both self-supporting, so that they can hold the bend or curve by themselves. Also, the metal walls of Späth are part of a metal hollow section, such as a frame. The metal wall sheets of Benson are 0.2 to 0.3mm thick (column 11, lines 53-54), which is 200-300μm thick. Benson further states that these metal wall sheets 12, 14 must be sufficiently hard or rigid so that they do not form around the spherical spacers, and the point contact is maintained between the spherical glass beads and the metal wall sheets (column 6, lines 52-57).

In contrast, the barrier sheets of the presently claimed invention have a thickness not greater than 100μm, which means that even if these barrier sheets were totally made of metal, they would not be thick enough to be self-supporting and to hold their curve or bend without support from the filler material. Hence, Benson and Späth provide no relevant teachings for panel envelopes having barrier sheets with a thickness not greater than 100μm.

Still further, the Examiner's alleged motivation for the combination with Applicants' admission regarding the prior art is again misplaced. The section at column 12 of Benson quoted by the Examiner has nothing to do with and makes no suggestion regarding the thickness of the barrier sheet. In fact, reducing the thickness of Benson's metal walls of 200-300μm to barrier sheets not greater than 100μm would have a negligible effect on the volume of the insulation

material. The portion of Benson cited by the Examiner suggests instead that a significant decrease in volume can be achieved by substituting expanded foam products having R values of 5 to 10 per inch for bulk insulations such as fiberglass, rockwool and cellulose with R values of 2-4 per inch. Therefore, again, the motivation for the proposed combination of references is lacking.

With regard to claim 2, the Examiner argues that Späth teaches that the calendaring operation is carried out by passing the "planar vacuum panel" between at least two rollers and a third element of at least equal length (top of page 4 of the Office Action). Again, this is a misstatement and distortion of the prior art. Späth has nothing to do with planar vacuum panels, but instead is directed to the bending of rigid hollow sections made entirely of metal.

In sum, the Examiner has improperly picked and chosen from four different prior art references and two different embodiments in each of Benson and Hunter to attempt to teach the presently claimed invention. Moreover, the Examiner has relied upon alleged motivations which have nothing to do with the present invention and do not even properly relate to the combinations proposed by the Examiner. Therefore, all of the rejections based upon the combination of Benson, Hunter, Späth and Applicants' admissions are unwarranted and should be withdrawn. Reconsideration and withdrawal of the rejections are respectfully requested.

With respect to the Examiner's rejections of claims 5 and 6 over the above combination further in view of Nishimoto, the Examiner acknowledges that the above combination of references does not expressly teach the vacuum panel is between 5 and 20mm thick. However, the Examiner argues that Nishimoto discloses vacuum panels using hard polyurethane foam having a thickness in a range of 10 to 20mm. The Examiner concludes that it would have been obvious to one skilled in the art to increase the thickness of the panel taught by the above combination of references to between 5 and 20mm as taught by Nishimoto. The alleged motivation would have been to increase the insulating properties of the panel.

While Applicants concede that vacuum panels having a thickness in a range of 10 to 20 mm or 5 to 20mm are known in the art, the motivation alleged by the Examiner goes against the teachings of Benson which the Examiner has already quoted above. Thus, the entire teaching of Benson is to produce ultra-thin compact vacuum insulation panels, and as quoted by the Examiner at column 12, lines 12-20, a premium is paid for volume, so that a high-performance insulation material occupying less volume is therefore more valuable. Accordingly, the proposed

modification and alleged motivation cited by the Examiner are again faulty, since Benson teaches against increasing the thickness of the panel and instead teaches ways to decrease the thickness of the panel while maintaining or increasing insulating properties. The rejection of claims 5 and 6 is therefore improper for this reason as well as the reasons set forth above for the basic combination. Reconsideration and withdrawal of the rejection are therefore respectfully requested.

Finally, with respect to claim 8, the Examiner contends that Benson teaches spacer beads coated with a polystyrene or similar adhesive material to be affixed to the wall sheets of the planar vacuum panel (column 7, lines 9-14), thus necessarily creating at least a layer of polymeric adhesive on at least one surface of the panel. The Examiner acknowledges that Benson does not expressly teach that the polystyrene layer is in a foam state, but contends that Haase discloses that polystyrene can be foamed. The Examiner argues that foamed polystyrene would be a similar adhesive to the polystyrene disclosed by Benson, and Benson recognizes that polystyrene has desirable insulating properties which would enhance the insulating properties of the vacuum panel as a whole. The Examiner therefore concludes that it would have been obvious to one skilled in the art to have placed adhesive polymeric foam on at least one surface of a vacuum panel and to have the panel curved by calendaring. This rejection is also respectfully but strenuously traversed.

First, as noted above, claim 8 has been amended to make clear that the at least one layer of adhesive polymeric foam is to be placed on at least one face of the panel, i.e., on an outer surface of the panel, not on an inside wall of the barrier sheets of Benson. Moreover, claim 8 specifies a layer of the adhesive polymeric foam placed on the face of the panel. In Benson, the polystyrene adhesive material is coated on the beads, not on the wall sheets 12 or 14. Moreover, Benson stresses that it is important that the spherical beads maintain a near "point" contact with the metal walls, so that it is not desirable that the polystyrene melt so much that it forms a layer on the walls. This is far different from the adhesive layer specified in claim 8, which is for the purpose of adhering the planar panel to an object to be insulated. Thus, as stressed in the present application, it is important to have uniform adhesion, so that air spaces do not exist between the insulating panel and the object to be insulated (see, for example, page 2, lines 15-18 of the Substitute Specification).

Accordingly, the rejection of claim 8 is improper for the above reasons in addition to the reasons already discussed above for the basic combination of four references. Reconsideration and withdrawal of the rejection are respectfully requested.

In view of the above Remarks, it is submitted that all of the claims in the application patentably distinguish over the prior art of record. Reconsideration and an early Notice of Allowance are respectfully solicited.

Respectfully submitted,

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